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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/628,047

07/24/2003

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112857-412

4039

29175 7590 10/07/2008  
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EXAMINER

CHU, HELEN OK

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

10/07/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/628,047	<b>Applicant(s)</b> KATO ET AL.	
	<b>Examiner</b> Helen O. Chu	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-9,11-16 and 19-24 is/are pending in the application.
- 4a) Of the above claim(s) 4-8,12-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,9,11 and 19-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. This Office Action is in response to the communication filed on 8/4/2008.

Applicant's arguments have been considered, but are not persuasive. Claims 19-24 are new.

#### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/4/2008 has been entered.

#### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 19 and 22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, the recitation "the ratios of styrene-butadiene latex adhesive to polyacrylic acid is between about 0.8:1 to about 4:1" was not disclose in the specification that would enable one of ordinary skill in the

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art to reasonably convey this matter. The closest disclosure is claim 1 which states 2-4 wt % of styrene butadiene latex adhesive and 0.5-2.5 wt% polyacrylic acid thickener, the ratio of 0.8-4:1 of latex to thickener is not related. Appropriate corrections or further clarifications are required.

4. Claims 19 and 22 are rejected under 35 U.S.C. 112, first paragraph, because the specification, does not reasonably provide enablement for about 0.8:1 to about 4:1. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. Specifically at the largest wt% of butadiene which is at 4 wt%, the ratios 0.8:1 to 4:1 do not describe this amount in contrast to the thickener. In addition to, Table 1 does not disclose how one of ordinary skill in the art at to get 0.8:1 of SBR to PAA. Appropriate corrections or further clarifications are required.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 19 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what type of ratio is encompassed by 0.8:1 to about 4:1 (i.e. mol ratios, mass ratio)

7. Claims 20 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claimed recitation of claim 1 discloses adhesive ranges from 2-4 wt % of adhesive and 0.5- 2.5 wt% and polyacrylic acid thickener

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however at less than 6 wt % which encompasses 0 wt% is not disclosed in claim 1.

Also, the larger ranges of the adhesive and the thickener which includes 6.5 wt% is not considered less than 6 wt%. Appropriate corrections or further clarifications are required.

8. Claims 21 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claimed recitation of claim 1 discloses adhesive ranges from 2-4 wt % of adhesive and 0.5- 2.5 wt% and polyacrylic acid thickener however, the range of 2.5-5% does not cover the larger of 2-4 wt % of adhesive and 0.5- 2.5 wt% and polyacrylic acid thickener. Appropriate corrections or further clarifications are required.

### ***Claims Analysis***

9. As it is best understood, the limitations of new claims 19-24 wherein the latex adhesive and polyacrylic acid thickener having a ratio of 0.8:1 to 4:1, less than 6 wt% of the cathode mixture layer and between about 2.5-5 wt% of the cathode mixture layer will be interpreted as latex adhesive and the polyacrylic acid thickener to have 2-4 wt% and 0.5 wt% to about 2.5wt% respectively.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 9, 11, 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al., US 6,632,566 in view of Yoshino et al., US 5,631,100.

Yamada teaches a nonaqueous electrolyte secondary battery comprising a positive electrode containing a  $\text{Li}_x\text{MyPO}_4$  compound (abstract). The  $\text{Li}_x\text{MyPO}_4$  compound has an olivine structure and M is at least one of 3d transition metals (5:14-20). Yamada teaches a specific example wherein M is Fe (iron) at column 6, lines 5-38. The battery further comprises a negative electrode and electrolyte (4:46-55). As a binder contained in the positive electrode active material, any suitable known resin material, routinely used as a binder for a layer of the positive electrode active material of this sort of nonaqueous battery, may be used (6:41-45).

Yamada does not explicitly teach a binder comprising a styrene butadiene latex adhesive and a polyacrylic acid thickener.

However, Yoshino teaches a secondary battery comprising a lithium-containing composite metal oxide cathode active material, a negative electrode and an electrolyte (abstract). The cathode active mixture contains 0.1-20 pbw, preferably 0.5-10 pbw of a binder material based on 100 pbw of the electrode active material. The binder preferably comprises styrene-butadiene latex (7:6-14). When a water-soluble polymer, such as styrene-butadiene latex is used as a binder, a water-soluble thickener may be added as an additive thereto in an amount of 2-60 pbw per 100 pbw of the solid value of the styrene-butadiene latex. Examples of water-soluble thickeners are polyacrylic acid,

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carboxymethylcellulose and methyl cellulose (8:8-17). The cathode may contain about 5 pbw of carbon material (graphite + acetylene black) to 100 pbw of positive active material (Examples). The battery exhibits a high voltage operative at a voltage of from 2.6 to 3.5 V (12:10-40).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use the known binder of Yoshino for the positive electrode binder of Yamada. Yamada teaches as a binder contained in the positive electrode active material, any suitable known resin material, routinely used as a binder for a layer of the positive electrode active material of this sort of nonaqueous battery, may be used (6:41-45). Yoshino is directed toward nonaqueous batteries with positive electrode binders containing a styrene butadiene latex adhesive and a thickener such as polyacrylic acid

### ***Response to Arguments***

10. Applicant's arguments filed 8/4/2008 have been fully considered but they are not persuasive.

Applicants' principal arguments are:

A) Applicant argues, “ *In Yamada the only support for adding carbon to the cathode mixture layer can be found .t col. 10 lns. 11-12, where 25% weight acetylene black is added to LiFePO<sub>4</sub> with PVDF as a binder. In Yoshino, no discussion is present in the specification for including a conductive agent hat is carbon in the cathode. In Example 1 of Yoshino, a cathode containing a lithium oxide and • pair of carbon agents*

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*is disclosed. However, first, that example contains PVDF as a binder with no thickener. Second, the binder is not greater than 2% weight of the cathode mixture layer 2 parts/(100+2.5+2.5+2) total parts = 1.87%. And third, the percent weight of carbon with respect to the total amount of cathode active material and carbon material is 4.76% (5 parts/105 total parts), which is outside the claimed range of 5-12%. Consequently, the combination of Yoshino and Yamada fails to disclose a cathode mixture layer containing olivinic  $\text{LiFePO}_4$ , 2-4% by weight SBR, 0.5-2.5% by weight PAA, and a carbon material as a conducting agent in 5-12% by weight with respect to the cathode active material and the carbon material.”* It is unclear how Applicants reach this conclusion. The claimed recitations clearly states "carbon material ranges from about 5 wt% to about 12 wt %." Also, the claim recitation clearly states “styrene butadiene latex adhesive in the cathode mixture layer ranges from about 2 wt% to about 4 wt%.” In addition, the Applicants admits in the Applicants Arguments/Remarks Page 9 “the range claimed by Applicants provides values of %wt PAA part of which fall outside of the ranges set forth in Yoshino when the values are properly converted to the pbw units described in Yoshino. Admittedly, part of the range falls within the area covered by Yoshino. However, Yoshino describes a thickener amount of between 2 to 60 pbw thickener per 100 pbw PAA. Applicants values when properly converted, shows a thickener range when used with PAA, SBR and olivinic  $\text{LiFePO}_4$  of 12.5 -125 pbw, substantially different from Yoshino's disclosure. Furthermore, Yoshino describes the SBR as between 0.1 to 20 pbw, preferably 0.5-10 pbw. In contrast, Applicants' claimed range is much narrower for the claimed combination of SBR, PAA and olivinic  $\text{LiFePO}_4$ .” That is, the Applicants



admit that the Yoshino reference discloses a PAA range that falls within an area of the Applicants claimed range and also, the Yoshino reference also discloses SBR to be broader than the claimed range. The Applicants uses examples conveniently outside of the claimed range to support the Applicants arguments, however, the Yoshino reference discloses "the present invention will be illustrated with reference to Examples, which, however, should not be construed as limiting the present invention (12:40-50)"

B) Applicants argue," *In addition, we briefly return to the discussion of units in Yoshino versus units in the claimed invention. First, Yoshino uses pbw for all its amounts. In theory, parts by weight per 100 pbw and weight % may reflect the same value. However, the units associated with these values make Yoshino's numbers quite different from the claimed invention. The claimed invention reports the amount of both the binder and the thickener in percent weight versus cathode mixture layer. Yoshino reports pbw of binder versus active material, and pbw of thickener versus binder. Neither binder nor thickener is reported by Yoshino as against the total weight of the cathode mixture layer, so the values are not the same as percent weight used in the claimed invention.*

*Using Example 17 in Yoshino as an example, we can compare the values calculated by each. Example 17 has 100 parts "active" (Yoshino uses needle coke in Example 17), 10 parts of a SBR latex solution having 50% solids giving 5 parts solid SBR, and 100 parts of a solution of "thickener" having 1% weight solids (Yoshino uses carboxymethyl cellulose as thickener in Example 17) giving 1 part solids thickener. From these numbers, Example 17 has total parts of solids of 106 parts."* However, the

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Applicants conveniently used only the solid part of the styrene-butadiene latex and not the styrene-butadiene latex as a whole. Furthermore, the examples in the Yoshino reference as disclosed "should not be construed as limiting the present invention (12:40-50)." Again, the Applicants admits in the Applicants Arguments/Remarks dated 8/4/2008 Page 9 "the range claimed by Applicants provides values of %wt PAA part of which fall outside of the ranges set forth in Yoshino when the values are properly converted to the pbw units described in Yoshino. Admittedly, part of the range falls within the area covered by Yoshino. However, Yoshino describes a thickener amount of between 2 to 60 pbw thickener per 100 pbw PAA. Applicants values when properly converted, shows a thickener range when used with PAA, SBR and olivinic LiFePO<sub>4</sub> of 12.5 -125 pbw, substantially different from Yoshino's disclosure. Furthermore, Yoshino describes the SBR as between 0.1 to 20 pbw, preferably 0.5-10 pbw. In contrast, Applicants' claimed range is much narrower for the claimed combination of SBR, PAA and olivinic LiFePO<sub>4</sub>.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen O. Chu whose telephone number is (571) 272-5162. The examiner can normally be reached on Monday-Friday 8am-4:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HOC

/PATRICK RYAN/  
Supervisory Patent Examiner, Art Unit 1795